

**WHAT IS CLAIMED IS:**

1. A coating composition for making a microarray comprising:  
a gelling agent or a precursor to a gelling agent and microspheres  
dispersed in a fluid;  
wherein, upon coating the composition on a substrate, said  
microspheres become immobilized in the plane of coating and form a random  
pattern on the substrate.
2. A coating composition according to claim 1 wherein said  
substrate is characterized by an absence of specific sites capable of interacting  
physically or chemically with the microspheres.
3. A coating composition according to claim 1 wherein the  
random pattern on the substrate is preserved upon gelation of the gelling agent.
4. A coating composition according to claim 1 wherein the  
microspheres can bear surface active sites.
5. A coating composition according to claim 4 wherein the surface  
active sites can carry organic or inorganic attachments.
6. A coating composition according to claim 4 wherein the surface  
active site is capable of chemical or physical interaction.
7. A coating composition according to claim 4 wherein the surface  
active site is bioactive.

8. A coating composition according to claim 7 wherein the bioactive site interacts with nucleic acid, protein, or fragments thereof.

9. A coating composition according to claim 1 wherein the microsphere contains a signature.

10. A coating composition according to claim 9 wherein the signature is comprised of an oil-soluble dye.

11. A coating composition according to claim 9 wherein the signature is interrogatable by optical, magnetic, or other electromagnetic means.

12. A coating composition according to claim 1 wherein the gelling agent is gelatin.

13. A coating composition according to claim 1 wherein the gelling agent undergoes thermal gelation.

14. A coating composition according to claim 12 wherein the gelatin is alkali pretreated gelatin.

15. A coating composition according to claim 1 wherein the microspheres have a mean diameter between 1 and 50 microns.

16. A coating composition according to claim 1 wherein the microspheres have a mean diameter between 3 and 30 microns.

17. A coating composition according to claim 1 wherein the microspheres have a mean diameter between 5 and 20 microns.

18. A coating composition according to claim 1 wherein the microspheres in the composition are immobilized on the substrate in a concentration between 100 and 1 million microspheres per  $\text{cm}^2$ .

19. A coating composition according to claim 1 wherein the microspheres in the composition are immobilized on the substrate in a concentration between 1000 and 200,000 microspheres per  $\text{cm}^2$ .

20. A coating composition according to claim 1 wherein the microspheres in the composition are immobilized on the substrate in a concentration between 10,000 and 100,000 microspheres per  $\text{cm}^2$ .

21. A coating composition according to claim 1 wherein the microspheres comprise a synthetic or natural polymeric material.

22. A coating composition according to claim 21 wherein the polymeric material is an amorphous polymer.

23. A coating composition according to claim 22 wherein the amorphous polymer is polystyrene.

24. A coating composition according to claim 4 wherein the microsphere contains a surface active site comprising a functionality selected from the group consisting of carboxy, amine, epoxy, hydrazine, aldehyde and combinations thereof.

25. A coating composition according to claim 1 wherein the microspheres contain a polymeric material and less than 30 weight percent of a crosslinking agent.

26. A coating composition according to claim 1 wherein the microspheres are prepared by emulsion polymerization or limited coalescence.

27. A microarray comprising:

a substrate coated with a composition comprising microspheres dispersed in a fluid containing a gelling agent or a precursor to a gelling agent, wherein the microspheres are immobilized at random positions on the substrate.

28. A microarray according to claim 27 wherein the substrate is free of receptors designed to physically or chemically interact with the microspheres.

29. A microarray according to claim 27 wherein the random pattern on the substrate is preserved upon gelation of the gelling agent.

30. A microarray according to claim 27 wherein the gelling agent is gelatin.

31. A microarray according to claim 27 wherein the microspheres bear chemically active sites.

32. A microarray according to claim 27 wherein the chemically active site is bioactive.

33. A microarray according to claim 27 wherein the substrate comprises glass, plastic, cellulose acetate, or polyethyleneterephthalate.

34. A microarray according to claim 25 wherein the substrate is flexible.

35. A method of making a microarray comprising the steps of:

--providing a substrate;

--coating on the substrate a composition containing microspheres and a gelling agent or precursor to a gelling agent;

wherein said composition is fluid during coating and the microspheres become randomly immobilized in the plane of the coating due to sol-gel transition; and

wherein the substrate is characterized by an absence of specific sites designed to interact physically or chemically with the microspheres.

36. A method according to claim 35 wherein said sol-gel transition occurs without the coating undergoing a drying process.

37. A method according to claim 35 wherein the gelling agent is gelatin.

38. A method according to claim 35 wherein the random immobilization of the microspheres on the substrate is preserved upon gelation of the gelling agent.

39. A method according to claim 35 wherein the composition is coated on the substrate using a method such as knife coating, blade coating or slot coating.

40. A method of making a microarray comprising the steps of:

--providing a substrate; and

--coating on the substrate a composition according to claim 1;

wherein said composition is fluid during coating and the microspheres become randomly immobilized in the plane of the coating due to sol-gel transition.